

AMENDMENTS TO THE CLAIMS:

This listing of claims replaces all prior versions and listings of claims in the application:

LISTING OF CLAIMS:

1. (Currently Amended) An optoelectronic component ~~with~~ comprising:
a semiconductor device chip (2) ~~which chip has~~ comprising at least one radiation-sensitive zone ~~(7, 8, 9) for detection of~~ configured to detect electromagnetic radiation; (17), and with
an optical element ~~for focusing~~ configured to focus the electromagnetic radiation (17) in the at least one radiation-sensitive zone(s) ~~(7, 8, 9) zone~~; ~~characterized in that~~ the optical element ~~[[is]]~~ comprising a diffractive element (1) ~~which has~~ having structures (14, 15) ~~which are~~ with sizes on the an order of magnitude of ~~[[the]]~~ a wavelength of the electromagnetic radiation (17).
2. (Currently Amended) The ~~[[An]]~~ optoelectronic component ~~according to~~ of claim 1, ~~[[;]]~~ wherein ~~characterized in that~~ the diffractive element (1) ~~is~~ comprises a zone plate.
3. (Currently Amended) The ~~[[An]]~~ optoelectronic component ~~according to~~ of claim 1, ~~wherein or 2~~; ~~characterized in that~~ the diffractive element (1) is incorporated in the semiconductor chip (2) device.

4. (Currently Amended) The [[An]] optoelectronic component according to one of claims 1-3; claim 1, wherein the at least one radiation-sensitive zone is configured to detect electromagnetic radiation characterized in that the radiation (17) which is to be detected has having a wavelength between about 100 nm and about 5 micron.

5. (Currently Amended) The [[An]] optoelectronic component according to of claim 4, [[;]] wherein the at least one radiation-sensitive zone is configured to detect electromagnetic radiation characterized in that the radiation (17) which is to be detected is in the visible spectral region having a wavelength from about of e. 400 nm to about [[-]] 800 nm.

6. (Currently Amended) The [[An]] optoelectronic component according to one of the preceding claims; of claim 1, characterized in that the wherein a distance between the diffractive element (1) and [[a]] the at least one radiation-sensitive zone (7, 8, 9) is less than about 20 micron.

7. (Currently Amended) The [[An]] optoelectronic component according to one of claims 2-6; of claim 2, characterized in that wherein:
the radiation-sensitive zone is configured to detect radiation with a wavelength lambda (λ);
and is detected in a radiation-sensitive zone (7, 8, 9)

the zone plate is at a distance R from the zone plate (1) radiation-sensitive zone and has a which zone plate has diameter D, wherein wherewith for [[the]] a Fresnel number F of the zone plate; (1) the following applies $F = \left(\frac{D^2}{\lambda R} \right) > 1$.

8. (Currently Amended) The ~~[[An]]~~ optoelectronic component ~~according to one of~~ claims 2-7; of claim 7, characterized in that the wherein a ~~the~~ focal length of the zone plate (1) for radiation with wavelength of about 550 nm is ~~in the range~~ from about 1 micron to about ~~[[-]]~~ 20 microns.

9. (Currently Amended) The ~~[[An]]~~ optoelectronic component ~~according to one of the~~ preceding claims; of claim 1, characterized in that the semiconductor chip (2) has wherein the at least one radiation-sensitive zone comprises a plurality of radiation-sensitive zones at varying distances from the optical element such that (7, 8, 9), ~~wherewith the~~ radiation-sensitive zones ~~for~~ configured to detect shorter wavelengths of the electromagnetic radiation are disposed ~~behind at~~ greater distances from the optical element compared to (downstream of) the radiation-sensitive zones configured to detect for longer wavelengths of the electromagnetic radiation. ~~reckoned in the~~ direction of the incident radiation (17).

10. (Currently Amended) The ~~[[An]]~~ optoelectronic component ~~according to~~ of claim 9, ~~characterized in that~~ wherein the radiation-sensitive zones ~~(7, 8, 9)~~ are disposed in ~~respective~~ corresponding focal planes ~~(11, 12, 13)~~ of the diffractive element (1) for ~~respective~~ corresponding colors.

11. (Currently Amended) The ~~[[An]]~~ optoelectronic component ~~according to~~ of claim 10, ~~[[;]]~~ characterized in that wherein the semiconductor chip (2) contains at least on radiation sensitive zone comprises:

a first radiation-sensitive zone ~~three radiation-sensitive zones (7, 8, 9)~~ disposed in respective ~~a focal planes (11, 12, 13)~~ plane of the diffractive element (1) ~~for respective primary colors (for wavelengths associated with red visible light;~~

a second radiation-sensitive zone in a focal plane of the diffractive element for wavelengths associated with green visible light; and

a third radiation-sensitive zone in a focal plane of the diffractive element for wavelengths associated with blue visible light. }.

12. (Currently Amended) The ~~[[An]]~~ optoelectronic component ~~according to one of the preceding claims; of claim 1,~~ characterized in that wherein the diffractive element (1) is produced by structuring of a layer which layer is applied to the semiconductor chip (2) or which comprises a layer is contained included in the semiconductor chip (2) device.

13. (Currently Amended) The ~~[[An]]~~ optoelectronic component ~~according to~~ of claim 12, ~~[[;]]~~ characterized in that wherein the structured layer [[is]] comprises a metallic layer.

14. (Currently Amended) The ~~[[An]]~~ optoelectronic component ~~according to one of claims 2-13; of claim 2,~~ characterized in that wherein the zone plate (1) is in the form of a phase

~~zone plate comprised of~~ comprises a first ~~two~~ transparent ~~material having an materials~~ (14, 15) with different indices ~~index~~ of refraction (n_1) and a second transparent material having an index of refraction (n_2), n_1 being different than n_2 .

15. (Currently Amended) ~~The~~ [[An]] optoelectronic component ~~according to~~ of claim 14, ~~[[;]]~~ characterized in that wherein the first transparent material comprises one of the two materials is a silicon oxide and the second transparent material ~~other material~~ [[is]] comprises a silicon nitride.

16. (Currently Amended) ~~The A method of fabricating an~~ optoelectronic component ~~according to one or more of the preceding claims; of claim 1,~~ characterized in that wherein the diffractive optical element comprises a structured layer included (1) is produced by structuring of a layer which layer is applied to the semiconductor chip (2) or which layer is contained in the semiconductor chip (2) device.

17. (Currently Amended) ~~The~~ [[An]] optoelectronic component ~~according to~~ of claim 16, ~~[[;]]~~ characterized in that wherein the semiconductor device chip (2) contains comprises an integrated circuit.

18. (Currently Amended) A method comprising:

using ~~Use of a zone plate to focus (1) for focusing and/or for wavelength selection of~~
electromagnetic radiation ~~(17) in (into)~~ into one or more radiation-sensitive zones ~~(7, 8, 9)~~ of a
radiation-detecting semiconductor ~~chip (2)~~ device.

19. (New) The method of claim 18, wherein using the zone plate to focus
electromagnetic radiation into one or more radiation-sensitive zones comprises:

using the zone plate to focus electromagnetic radiation with wavelengths associated with red
visible light into a first radiation-sensitive zone;

using the zone plate to focus electromagnetic radiation with wavelengths associated with
green visible light into a second radiation-sensitive zone;

using the zone plate to focus electromagnetic radiation with wavelengths associated with
blue visible light into a third radiation-sensitive zone.

20. (New) The optoelectronic component of claim 1, wherein the semiconductor
device comprises a semiconductor chip.